MORPHOMETRIC AND GEOLOGICAL DATA FOR NINETEEN LAKES IN THE PARRY SOUND AND NIPISSING DISTRICT AND HALIBURTON COUNTY

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MORPHOMETRIC AND GEOLOGICAL DATA FOR NINETEEN LAKES IN THE PARRY SOUND AND NIPISSING DISTRICT AND HALIBURTON COUNTY

DATA REPORT DR 90/2

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PREFACE

The Data Report Series is intended as a readily available source of basic data collected for lakes and watersheds in Ontario. These data were collected as part of the Lakeshore Capacity study and/or the Acid Precipitation in Ontario Study.

The limnological portion of the lakeshore Capacity Study (1975-81) was initiated to investigate the relationships between lakeshore development and lake trophic status in low ionic strength Precambrian lakes. The Acid Precipitation in Ontario Study (1979-present) was initiated, in part, to investigate the effects of the deposition of strong acids on aquatic and terrestrial ecosystems in Ontario. The primary findings of these studies have been and will continue to be published as reviewed papers and technical reports.

ABSTRACT

This report summarizes the morphometric, and geological data for Bat, Clara, Clear, Cradle, Crystal, Delano, Drummer, Little Eastend, Little Whetstone, Louck's, Maggie, Pearceley, Pincher, Round, Shoelace, Skidway, Sunset, Westward and Windfall Lake.

Girard, R. and R.A. Reid. 1989. Morphometric and geological data for nineteen lakes in the Parry Sound and Nipissing District and Haliburton County. Ontario Ministry of the Environment Data Report DR 89/4.

SOMMAIRE

Le présent rapport résume les données morphométriques et géologiques des lacs suivants: Bat, Clara, Clear, Cradle, Crystal, Delano, Drummer, Little Eastend, Little Whetstone, Louck's, Maggie, Pearcely, Pincher, Round, Shoelace, Skidway, Sunset, Westward et Windfall.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

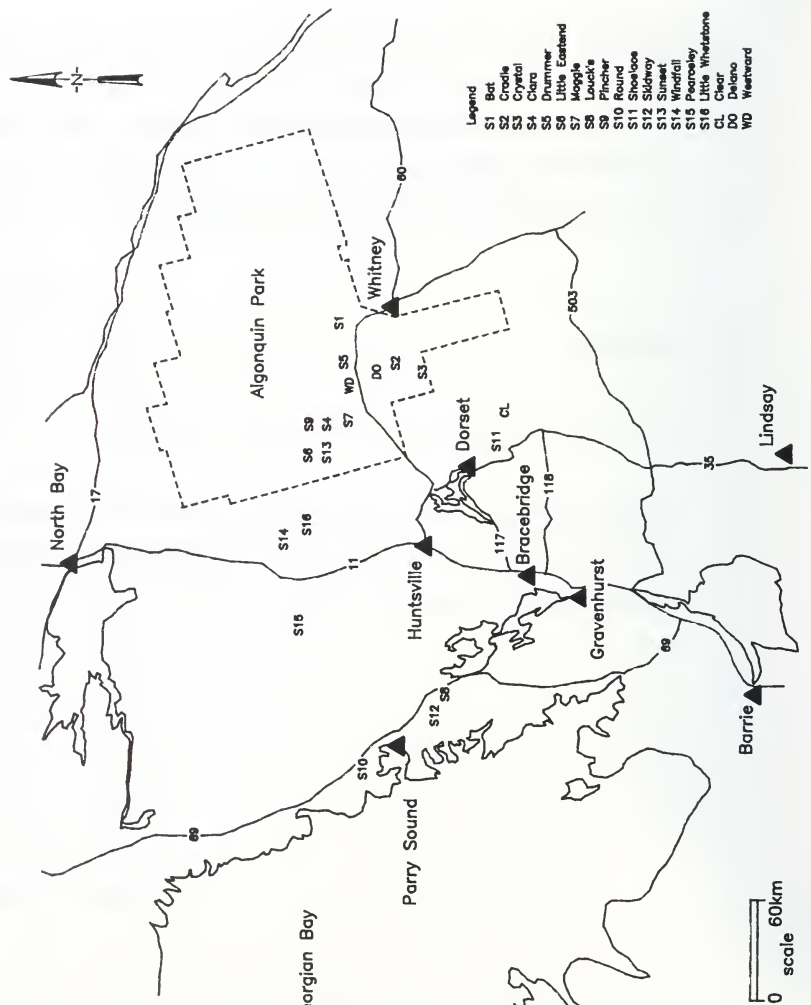
This report summarizes the morphometric and geological data for nineteen lakes in the Districts of Nipissing and Parry Sound and the County of Haliburton. The data was collected from 1986-1988 for Bat, Clara, Clear, Cradle, Crystal, Delano, Drummer, Little Eastend, Little Whetstone, Louck's, Maggie, Pearceley, Pincher, Round, Shoelace, Skidway, Sunset, Westward and Windfall Lake.

2. METHODS

The location of the nineteen study lakes are shown in Figure 1.

The lake sampling and analytical methodology are described in detail in Locke and Scott (1986). The calculated morphometric parameters for each lake are defined by Hutchinson (1957), and Nicolls et al. DR 83/3.

Figure 1. Map of the Study Area



3. STUDY AREA

a) Morphometry

The morphometry for Clear, Delano and Westward lakes were initially presented in Reid et al. 1984, DR 84/1. Appendix 1 presents these original data with the additions of shoreline length, development of shoreline D_L and development of volume D_V. Little Whetstone, Pearceley and Windfall were echo-sounded in 1988. The morphometry data in metres for Delano, Round and Westward Lake were developed from Ministry of Natural Resources Lake Inventory Maps (surveyed in feet). The remaining twelve lakes were echo-sounded in 1986 (Table 1 and Appendix 1).

b) Drainage Network

A detailed drainage network for each of the nineteen study lakes is presented from catchment, through major lakes and river systems, to the point of entry into the Great Lakes - St. Lawrence drainage system.

The drainage network is summarized in Table 2, as tertiary watershed subdivision units of Ontario.

Table 1. Summary of morphometric data.

Lake	Area A_o (ha)	Mean Depth $\bar{z}$ (m)	Maximum Depth Z_m (m)	Volume V (m^3x10^5)
Bat	2.33	2.94	8.3	0.69
Clara	30.18	4.61	11.0	13.92
Clear[1]	88.4	12.4	33.0	109.1
Cradle	17.89	12.44	33.3	22.25
Crystal	41.02	4.33	17.1	17.77
Delano[2]	23.9	7.13	18.6	17.0
Drummer	24.17	3.62	10.2	8.75
Little Eastend	11.67	6.04	15.5	7.05
Little Whetstone	10.6	3.51	13.6	3.73
Louck's	20.84	2.28	8.2	4.74
Maggie	138.60	10.17	31.0	141.00
Pearceley	44.1	4.72	8.1	20.82
Pincher	42.06	6.06	15.5	25.48
Round[2]	226.00	4.38	11.6	99.08
Shoelace	7.23	4.46	12.0	3.23
Skidway	18.48	2.89	7.8	5.35
Sunset	12.94	1.82	6.5	2.36
Westward[2]	63.3	20.5	44.0	129.4
Windfall	25.7	4.35	13.8	11.16

[1] Schindler, D.W. and J.E. Nighswander. 1970. J. Fish. Res. Bd. Canada (converted to metric)

[2] Data from the Ministry of Natural Resources lake inventory maps (converted to metric).

Table 2. Drainage Network (Ontario tertiary watershed subdivision units). Cox, E.T. (1978).

Unit	Drainage Network	Lake
2EA 14	Parry Sound	Round
20	Distress River	Pearceley
21	North Magnetawan River	Windfall
22	Upper Magnetawan River	Little Whetstone
2EB 02	Moon - Go Home River	Skidway
05	Rosseau Lake	Louck's
11	Oxtongue River	Drummer, Westward
15	Big East River	Clara, Little Eastend, Maggie, Pincher, Sunset
2HF 08	Kennisis River	Clear, Shoelace
2KD 01	Upper Madawaska River	Delano
18	South Madawaska River	Cradle, Crystal
20	North Madawaska River	Bat

Bat Lake

Bat is a headwater lake with no perennial inflows in its catchment. Bat flows ephemerally into the North Madawaska River. The Madawaska River flows east through a series of lakes to the Ottawa River at Arnprior.

Clara Lake

Clara Lake watershed has eight ponds and lakes Pincher and Stutter in its catchment. Clara flows through McCraney Lake to the Big East River. The Big East River flows south through a series of lakes to enter the North Muskoka River, part of the Muskoka and Moon River System. This system flows into Georgian Bay on Lake Huron.

Clear Lake

Clear Lake is a true headwater lake with no ponds in its watershed. Clear Lake's watershed has only ephemeral streams and none of the basin boundary is greater than 0.4 km from the lake. The Clear Lake outflow enters the east arm of Big Hawk Lake which flows southward to Halls Lake. Hall Lake flows through many lakes including Boshkung, Mountain and Horseshoe, en route to the Gull River. The Gull River eventually reaches Lake Simcoe and then Georgian Bay on Lake Huron. (Reid et al. DR 86/1). Drainage flow

diverted through the Trent-Severn controls at Balsam Lake may also flow easterly to enter Lake Ontario at Trenton.

Cradle Lake

Cradle is a headwater lake with no perennial inflows in its catchment. Cradle flows into Plough Lake and then through a series of lakes, via Head Creek to the Madawaska River system. The Madawaska River flows east through a series of lakes to the Ottawa River at Arnprior.

Crystal Lake

Crystal is a headwater lake with no perennial inflows in its catchment. Crystal flows through Rence, Harry, Welcome, and Pen lakes and into the South Madawaska River which enters into the Madawaska River system. This system flows east and enters the Ottawa River at Arnprior.

Delano Lake

Delano Lake has one beaver pond in its watershed. The lake flows through Cache Lake and into the Upper Madawaska River. The Madawaska River system flows east through a series of lakes to enter the Ottawa River at Arnprior.

Drummer Lake

Drummer Lake has one lake in its catchment - Tonakela Lake. Drummer flows through Gill and Sam lakes to the Oxtongue River system and into the Lake of Bays. The flow continues through the Muskoka and Moon River system to Georgian Bay on Lake Huron.

Little Eastend Lake

Little Eastend Lake is a headwater lake with one beaver pond within its watershed. The flow continues through McCraney Lake to the Big East River and through the Muskoka and Moon River system to Georgian Bay on Lake Huron.

Little Whetstone Lake

Little Whetstone Lake has two small lakes in its watershed. The lake flows into a tributary of the Upper Magnetawan River. The flow direction continues through the Magnetawan River system through Bying Inlet to Georgian Bay on Lake Huron.

Louck's Lake

Louck's Lake is a headwater lake with no perennial inflows in its catchment. Louck's flows into Lake Joseph, part of the Muskoka and Moon River system. The flow continues through this system to Georgian Bay on Lake Huron.

Maggie Lake

Maggie Lake is a headwater lake with no perennial inflows in its catchment. Maggie flows through a series of ponds to the Big East River which flows west into the North Muskoka River. The flow continues through the Muskoka and Moon River system to Georgian Bay on Lake Huron.

Pearceley Lake

Pearceley Lake is a headwater lake with no perennial inflows in its catchment. Pearceley flows through Boyce Creek to Distress River and continues west through the Magnetawan River system to Georgian Bay at Bying Inlet.

Pincher Lake

Pincher Lake has one pond and Stutter Lake in its catchment. Pincher flows through Clara and McCraney lakes to the Big East River. The Big East River flows south through a series of lakes to enter the North Muskoka

River, part of the Muskoka and Moon River system, to Georgian Bay on Lake Huron.

Round Lake

Round Lake has one pond, and Fox and Burnt lakes in its catchment. Round flows south through the Blair Creek lake chain of Upper Marsh, Marsh, Cranberry, Spectacle, and Simmes lakes which enter Sawdust Bay on Parry Sound of Georgian Bay.

Shoelace Lake

Shoelace Lake is a headwater lake with no perennial inflows in its catchment. The lake flows through a series of ponds to Sherborne Lake. Sherborne Lake naturally flows west to St. Nora Lake. Water management control during the high-flow spring season however, results in discharge from the most southerly tip of the lake into Big Hawk Lake. The natural outflow entering St. Nora reaches Boshkung Lake via Kushog Lake. The water-managed outflow, entering Big Hawk Lake reaches the Gull River by a series of lakes and rivers. The Gull River flows into Balsam Lake south of Coboconk. Balsam Lake outflows east and west through the Trent-Severn controls to either Lake Ontario or Georgian Bay respectively.

Skidway Lake

Skidway Lake is a headwater lake with no perennial inflows in its catchment. Skidway flows into Code Lake which drains into Healey Lake. Healey Lake flows into the Moon River system to Georgian Bay on Lake Huron.

Sunset Lake

Sunset Lake is a headwater lake with no perennial inflows in its catchment. Sunset flows through Nightfall and Cripple Creeks to enter the Big East River. The Big East River flows through a series of lakes to the North Muskoka River which joins the Muskoka and Moon River system.

Westward Lake

Westward Lake has one pond in its watershed. Westward flows through another pond and enters the Oxtongue River. The flow continues through to Lake of Bays and into the South Muskoka River. The Muskoka and Moon River system enters Georgian Bay on Lake Huron.

Windfall Lake

Windfall Lake is a headwater lake with no perennial inflows in its catchment. Windfall flows into the Little North Magnetawan River and successively through the Magnetawan River system, to enter Georgian Bay at Bying Inlet.

c) Bedrock Geology

The bedrock geology is summarized in several sources including Jeffries and Snider (1983); Lumbers (1976); and Wynne - Edwards (1972).

d) Surficial Geology

The regional surficial geology is summarized by Jeffries and Snider (1983); Geddes and McClenaghan (1984); Ford and Geddes (1986) and Mollard (1981). This report represents only a summary of the surficial geology of the study catchments.

All of the catchments are dominated by exposed bedrock or discontinuous till, with the exception of Bat Lake. (Table 3).

The surficial map information was derived from available resources prior to publication. (Table 4).

Table 3. Surficial geology as a percent of the catchment area.

	Surficial Type									
Lake	1	2	2a	2b	2c	3	4a	5	8	Pond
Bat	6.7	1.4	-	-	-	-	-	-	91.9	-	-
Clara	7.6	36.3	-	36.4	9.1	-	-	-	-	8.9	1.7
Clear	28.4	2.7	67.2	1.1	-	-	-	-	-	0.6	-
Cradle	32.3	0.4	44.6	-	22.7	-	-	-	-	-	-
Crystal	22.8	-	-	66.8	-	-	-	10.4	-	-	-
Delano	9.7	56.4	7.8	0.7	3.5	-	-	-	12.7	8.8	0.4
Drummer	8.4	30.1	2.3	51.8	-	-	1.5	-	-	1.6	4.4
Little Eastend	12.7	34.1	-	49.2	-	-	-	-	-	3.5	0.5
Little Whetstone	13.8	-	-	86.2	-	-	-	-	-	-	-
Louck's	19.2	80.8	-	-	-	-	-	-	-	-	-
Maggie	47.8	17.3	5.1	25.4	-	-	-	-	4.2	0.2	-
Pearceley	27.7	-	-	64.7	-	-	-	-	7.5	-	-
Pincher	14.0	61.8	-	19.1	-	-	-	-	-	2.7	2.4
Round	28.6	15.4	-	-	46.6	-	-	-	-	4.9	4.5
Shoelace	14.2	-	-	-	-	85.8	-	-	-	-	-
Skidway	16.7	-	83.3	-	-	-	-	-	-	-	-
Sunset	16.2	10.4	-	73.4	-	-	-	-	-	-	-
Westward	27.6	49.4	-	15.1	2.5	-	-	-	4.9	-	0.5
Windfall	19.2	-	-	80.8	-	-	-	-	-	-	-

Surficial geology composition types (Ontario Geological Survey)

1. Bedrock knobs, ridges, in places with very thin, discontinuous drift cover; unsubdivided Middle to Late Precambrian metaplutonic and metasedimentary rocks.
2. Bedrock-drift complex: thin drift with numerous outcrops:
   - 2. unsubdivided veneer;
   - 2a. mainly till cover;
   - 2b. mainly sand and gravel cover;
   - 2c. thin to discontinuous silt/clay, generally clay from unit 6b.
3. Till: Silty and to sand, stoney till:
   - 3. unsubdivided;
   - 3a. compact to subcompact, silty sand till, low clast content;
   - 3b. loose to moderately compact, sandy, clast rich till.
4. Glaciofluvial, ice contact stratified deposit: sand, gravel, boulders, minor till, silt:
   - 4a. kames, kame terraces, stagnant ice features;
   - 4b. eskers, esker complexes.
5. Glaciofluvial outwash:
   - 5. unsubdivided;
   - 5a. mainly sand;
   - 5b. mainly gravel and sandy gravel.
6. Glaciolacustrine deposits sand, silt, clay:
   - 6a. fine to medium sand;
   - 6b. silt and clay.
7. Aluvium: fine sand, silt, organics, muck.
8. Swamp and organic deposits: peat, muck.

Pond Pond area within the watershed.

Table 4. Surficial map information sources.

Lake		Topography	Geology	Scale
Bat	S1	31E10	P.2698	1: 50,000
Clara	S4	31E10	P.2698	1: 50,000
Clear	CL	31E02	[2]	
Cradle	S2	31E07	P.2705	1: 50,000
Crystal	S3	31E08	P.2706	1: 50,000
Delano	DO	31E10	P.2705, P.2698	1: 50,000
Drummer	S5	31E10	P.2698	1: 50,000
Little Eastend	S6	31E10	P.2698, P.2705	1: 50,000
Little Whetstone	S16	31E11	5502	1:100,000
Louck's	S8	31E04	5504	1:100,000
Maggie	S7	31E07, 10	P.2698, P.2705	1: 50,000
Pearceley	S15	31E11,12	5502	1:100,000
Pincher	S9	31E10	P.2698	1: 50,000
Round	S10	41H-9	5500	1:100,000
Shoelace	S11	31E02	[1]	1: 50,000
Skidway	S12	31E04	5504	1:100,000
Sunset	S13	31E10	P.2698	1: 50,000
Westward	WD	31E07	P.2705	1: 50,000
Windfall	S14	31E14	5502	1:100,000

[1] Surficial map provided by (Kaszycki unpub. data) (Canadian Geological Survey).
[2] Surficial geology described in R.A. Reid and W.R. Snider DR 86/1.

The percent of the land area that is exposed bedrock or discontinuous till is:

Bat	0.02%	Maggie	91.5%
Clara	90.2 %	Pearceley	86.9%
Clear	99.1 %	Pincher	96.7%
Cradle	100.0 %	Round	92.7%
Crystal	86.6 %	Shoelace	100.0%
Delano	76.1 %	Skidway	100.0%
Little Eastend	96.0 %	Sunset	100.0%
Little Whetstone	100.0 %	Westward	93.1%
Louck's	100.0 %	Windfall	100.0%

Bat Lake

Bat Lake catchment is dominated (91.9% of the area) by unsubdivided glaciofluvial outwash. The bedrock ridges with very thin discontinuous drift cover occupy 1.4% of the watershed.

Clara Lake

Bedrock outcrops (36.3%) and thin till drift (45.5%) are the main type of surficial geology throughout the catchment. The pond area above Clara Lake represents 1.7% of the watershed. Two pockets of swamp or organic deposit cover 8.9% of the catchment.

Clear Lake

Thin till and rock ridges dominate the surficial geology of Clear Lake (71.5% of the watershed). Several small zones of more continuous thin till are west and north of the lake. The sinuous, exposed bedrock areas are generally associated with a biotite gneiss ridge area parallel to the strike of the bedrock and a fault pattern which also strikes in the same direction. Much of the exposed bedrock is along the lake shoreline, resulting from wave erosion of the thin till during periods of high lake level.

The only major peat bog is at the extreme south-west corner of the lake. Several small isolated pockets of peat occur in the north-east section of the watershed. Clear Lake watershed contains no glacial fluvial deposits (Reid et al. DR 86/1).

Cradle Lake

The Cradle Lake catchment is dominated (44.6% of the area) by an unsubdivided veneer with numerous bedrock outcrops, accompanied by areas (22.7%) of sand and gravel cover. Bedrock knobs account for 0.4% of the watershed.

Crystal Lake

Till cover is the main surficial geology feature covering 66.8% of the catchment area. Glaciofluvial deposits of kame and kame terraces cover 10.4% of the catchment.

Delano Lake

Bedrock knobs and ridges with very thin, discontinuous drift cover, dominate (56.4% of the area) the surficial geology of Delano Lake catchment. Adjacent areas of thin drift with numerous outcrops (12.0%) are accompanied by glaciofluvial outwash (12.7%) which settled in pockets of low elevation. Organic depositions (8.8%) follow Delano Creek from the one pond (0.4% of the area) to Delano Lake.

Drummer Lake

The Drummer Lake catchment is dominated by a bedrock drift complex (54.1%) and bedrock knobs (30.1%). Tonakela Lake and a pond account for 4.4% of the area of the watershed. Unsubdivided till of silty sand to sand, stoney till (1.5%) and organic deposits (1.6% of the area) exist within the catchment.

Little Eastend Lake

Bedrock-drift complex (49.2%) and bedrock knobs and ridges (34.1%) are the main types of surficial geology throughout the catchment. Pond area cover (0.5%) and organic deposits (3.5%) account for the remaining area of the watershed.

Little Whetstone Lake

Mainly high local relief with bedrock knobs penetrating a thin drift veneer dominates 86.2% of the surficial geology of Little Whetstone Lake. The remaining area is lake surface.

Louck's Lake

Louck's Lake catchment is dominated (80.8%) by bedrock knobs, ridges and in places, with very thin discontinuous drift cover, with unsubdivided Middle to Late Precambrian metaplutonic rocks and metasedimentary rocks.

Maggie Lake

Maggie Lake catchment has bedrock-drift complexes (30.5%) and bedrock knobs and ridges with very thin discontinuous drift cover (17.3%). Unsubdivided glaciofluvial outwash cover 4.2% and an organic deposit 0.2% of the catchment.

Pearceley Lake

Throughout the north-east and south (64.7%) of this catchment a drift veneer of ground moraine is distributed over mainly moderate local relief with mixed wet and dry areas, among bedrock knobs. The west margin (7.5%) of this catchment is composed of similar relief with pockets of peat among the bedrock knobs.

Pincher Lake

Pincher Lake catchment is dominated (61.8% of the area) by bedrock knobs and ridges, with very thin discontinuous drift cover. Adjacent sections of till cover account for 19.1% of the catchment. Pond areas cover 2.4%, and swamp and organic deposits cover 2.7% of the catchment.

Round Lake

Round Lake catchment is dominated (46.6% of the area) by bedrock-drift complexes and bedrock knobs and ridges with very thin discontinuous drift cover (15.4%). Swamp and organic deposits cover 4.9% of the catchment. Pond area (4.5%) and Fox, Burnt and Round lake areas (28.6%) cover the remaining surface area of the catchment.

Shoelace Lake

Thin to discontinuous silt/clay from glacialacustrine deposits represent 85.8% of the Shoelace Lake catchment. The remainder of the catchment is lake surface area.

Skidway Lake

Thin drift with numerous bedrock outcrops represent 83.3% of the Skidway Lake catchment, while the remaining 16.7% is lake surface area.

Sunset Lake

Sunset Lake catchment is dominated (73.4% of the area) by mainly till cover of thin drift with numerous bedrock outcrops. Bedrock knobs and ridges with places of very thin discontinuous drift cover, represent 10.4% of the catchment.

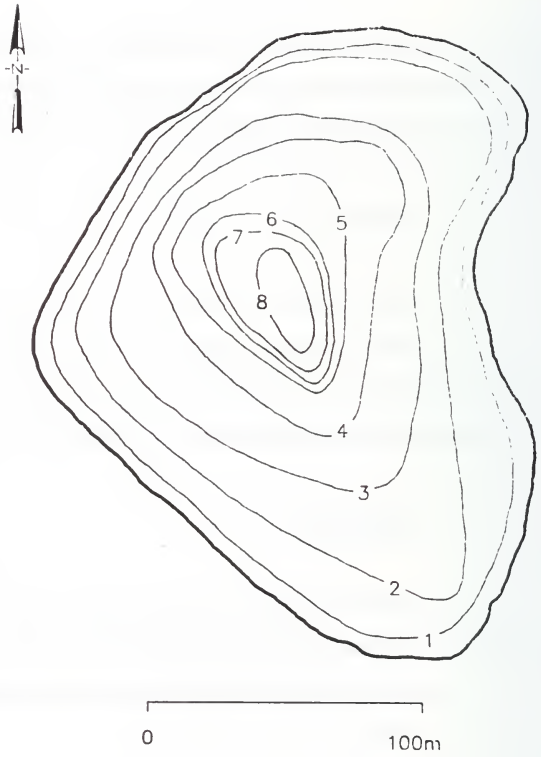
Westward Lake

Bedrock knobs and ridges with very thin discontinuous drift cover dominate 49.4% of the lake catchment. A bedrock drift complex covers 17.6% of the watershed. Glaciofluvial outwash (4.9%) borders the only pond (0.5%) situated in the north margin of the Westward Lake catchment.

Windfall Lake

Thin till with bedrock knobs and ridges of mainly high and dry local relief dominates (80.8%) the Windfall Lake catchment. The thin till is a drift veneer of terraced and sloping ground moraine. The remaining area is lake surface.

Figure 2: Bat Lake



Nipissing Dist.
Canisbay Tp.
Lat.45°35' Long.78°31'

Table 5. Bat Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
2.33	0.69	2.94	8.3	0.64	1.18	1.06

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	2.33	0.40
2	1.59	0.20
4	0.55	0.06
6	0.16	0.02
8.3	0.00	

Figure 3: Clara Lake

Table 6. Clara Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
30.18	13.92	4.61	11.0	3.81	1.96	1.26

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	30.18	5.19
2	23.04	4.12
4	17.81	2.89
6	10.10	1.29
8	3.72	0.40
10	0.66	0.03
11	0.00	

Figure 4: Clear Lake

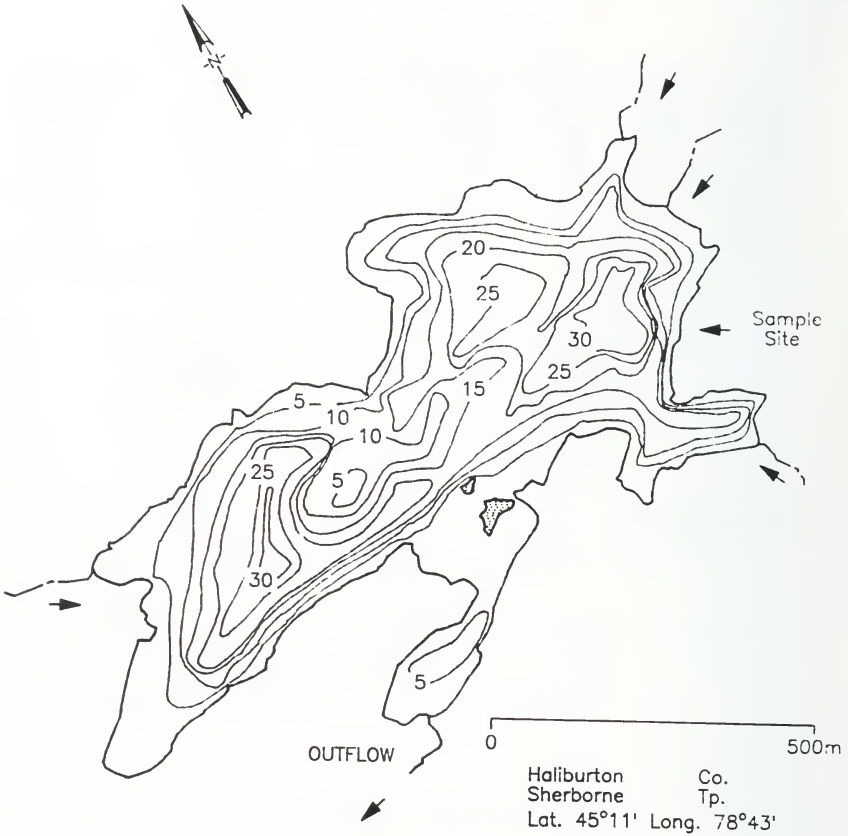


Table 7. Clear Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
88.4	109.1	12.4	33.0	6.73	2.02	1.12

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	88.4	
		16.5
2	77.0	
		14.3
4	66.4	
		12.5
6	58.4	
		11.1
8	52.7	
		10.0
10	47.3	
		8.89
12	41.6	
		7.79
14	36.3	
		6.73
16	31.1	
		5.70
18	26.0	
		4.72
20	21.3	
		3.76
22	16.4	
		2.84
24	12.1	
		2.03
26	8.28	
		1.32
28	5.04	
		0.751
30	2.60	
		0.250
33	0.298	

Figure 5: Cradle Lake

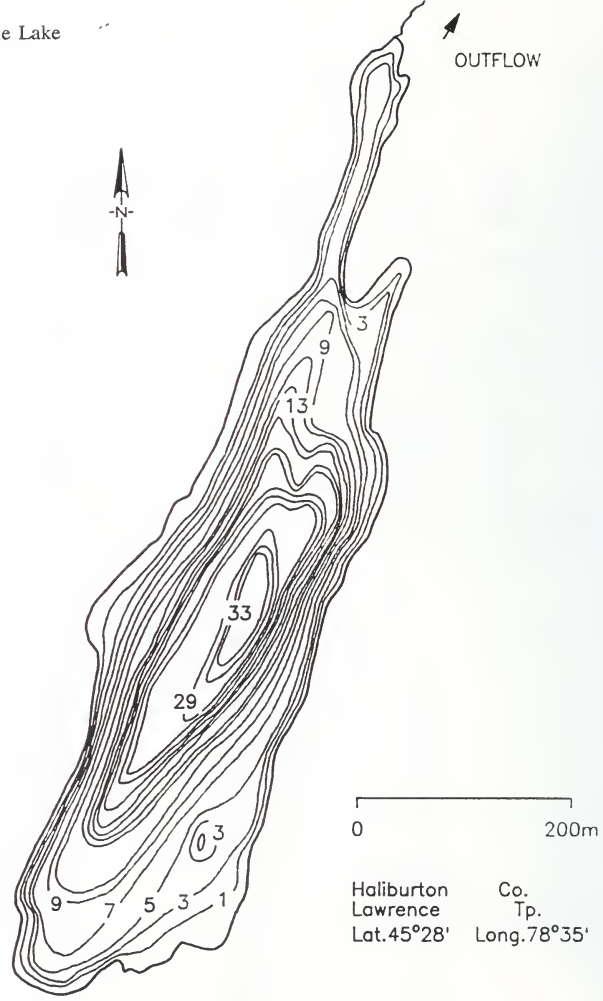


Table 8. Cradle Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
17.89	22.25	12.44	33.3	2.44	1.63	1.12

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	17.89	
		3.42
2	16.34	
		3.11
4	14.74	
		2.77
6	12.78	
		2.35
8	10.86	
		2.00
10	9.04	
		1.63
12	7.50	
		1.38
14	6.24	
		1.13
16	5.25	
		0.99
18	4.56	
		0.85
20	3.96	
		0.74
22	3.42	
		0.63
24	2.87	
		0.52
26	2.39	
		0.41
28	1.42	
		0.19
30	0.65	
		0.10
32	0.40	
		0.04
33.3	0.00	

Figure 6: Crystal Lake

Table 9. Crystal Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
41.02	17.77	4.33	17.1	5.61	2.47	0.76

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	41.02	
		6.25
2	24.72	
		4.20
4	17.11	
		2.89
6	12.08	
		1.98
8	7.60	
		1.15
10	4.40	
		0.69
12	2.71	
		0.43
14	1.68	
		0.24
16	0.64	
		0.04
17.1	0.00	

Figure 7: Delano Lake

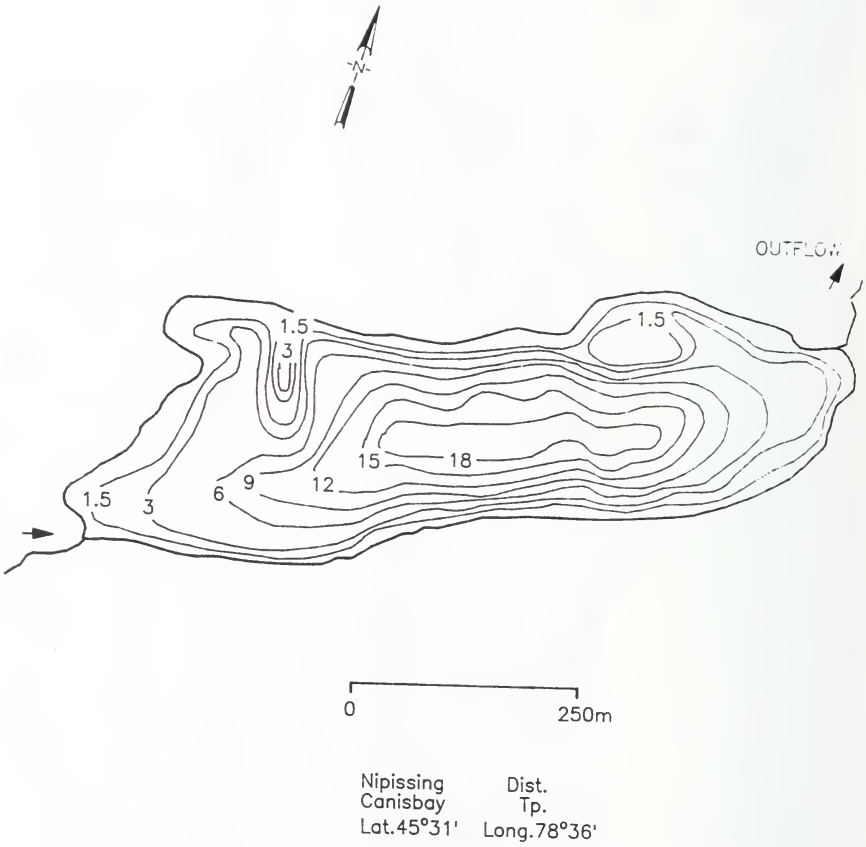


Table 10. Delano Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
23.9	17.04	7.13	18.6	1.99	1.15	1.14

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	23.9	4.27
2	18.9	3.25
4	13.7	2.45
6	10.8	1.98
8	9.01	1.61
10	7.13	1.29
12	5.79	1.01
14	4.36	0.710
16	2.80	0.432
18	1.58	0.032
18.6	0.000	

Figure 8: Drummer Lake

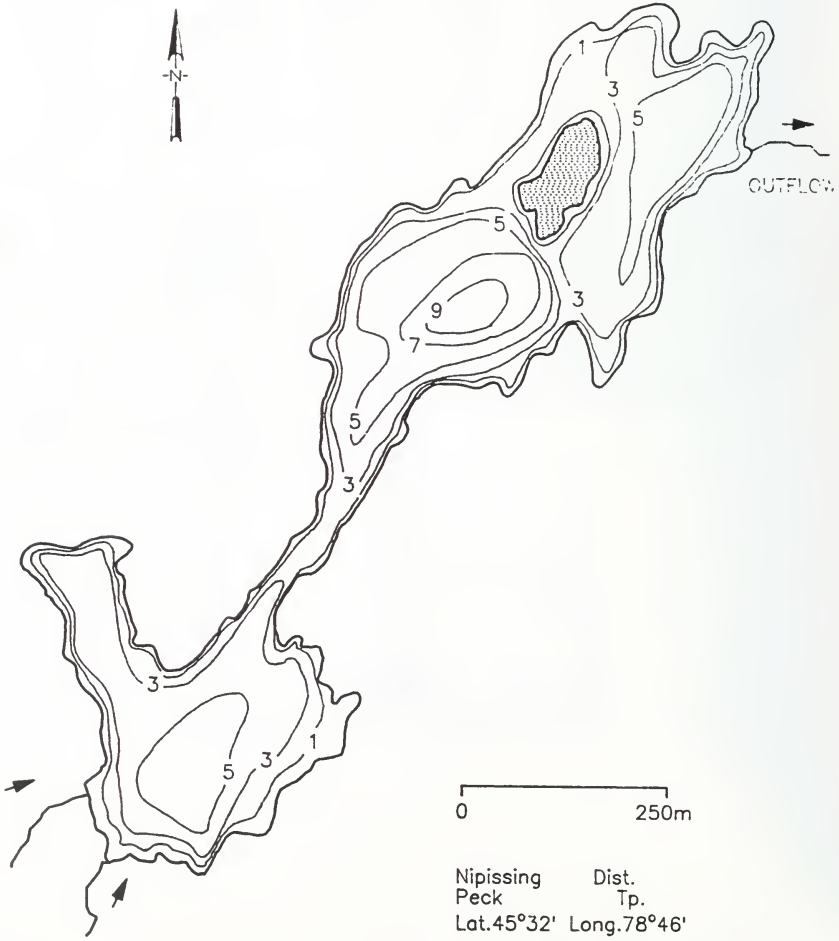
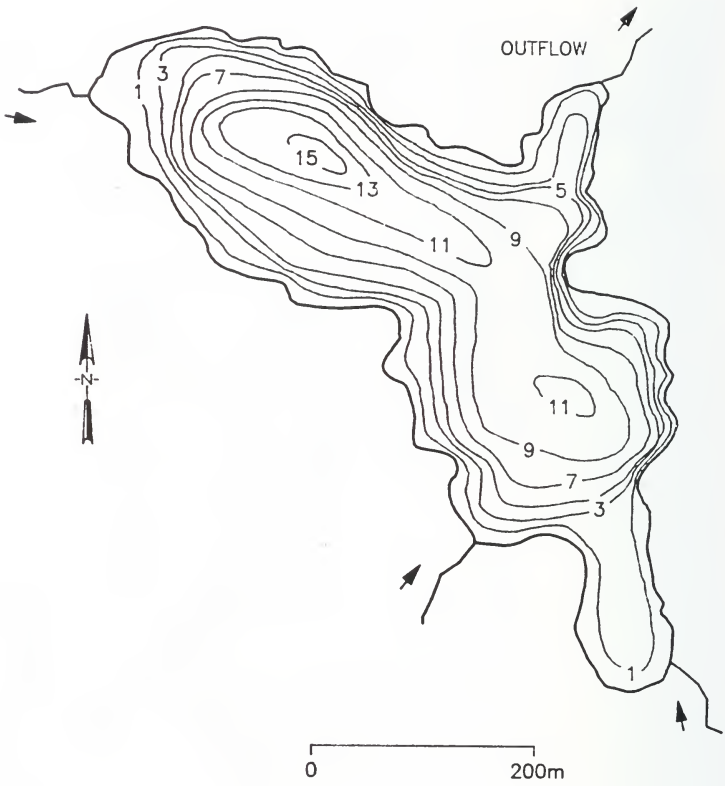


Table 11. Drummer Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
24.17	8.75	3.62	10.2	4.44	2.55	1.07

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	24.17	4.10
2	17.43	2.86
4	10.33	1.35
6	3.55	0.35
8	0.87	0.08
10.2	0.00	

Figure 9: Little Eastend Lake



Nipissing Dist.
McCraney Co.
Lat.45°34' Long.78°57'

Table 12. Little Eastend Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_V
11.67	7.05	6.04	15.5	2.12	1.75	1.17

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	11.67	
		1.99
2	8.74	
		1.58
4	7.23	
		1.32
6	5.95	
		1.05
8	4.40	
		0.69
10	2.33	
		0.29
12	0.89	
		0.12
14	0.26	
		0.02
15.5	0.00	

Figure 10: Little Whetstone Lake

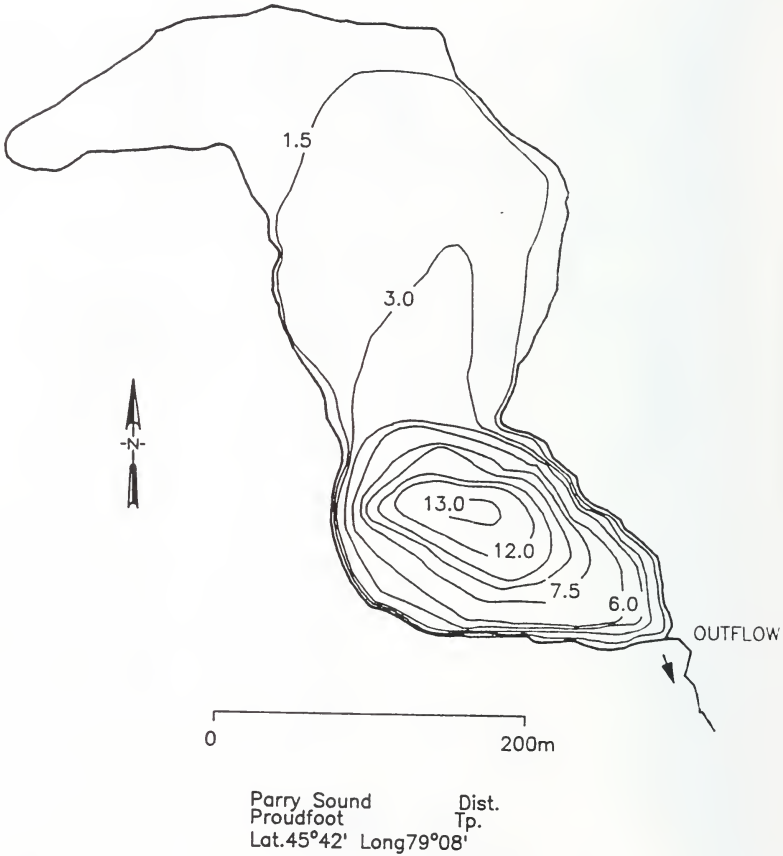


Table 13. Little Whetstone Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
10.6	3.73	3.51	13.6	1.8	1.54	0.77

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	10.64	1.70
2	6.18	0.84
4	3.00	0.50
6	2,18	0.34
8.1	1.28	0.21
10	0.797	0.12
12	0.415	0.03
13.6	0.000	

Figure 11: Louck's Lake

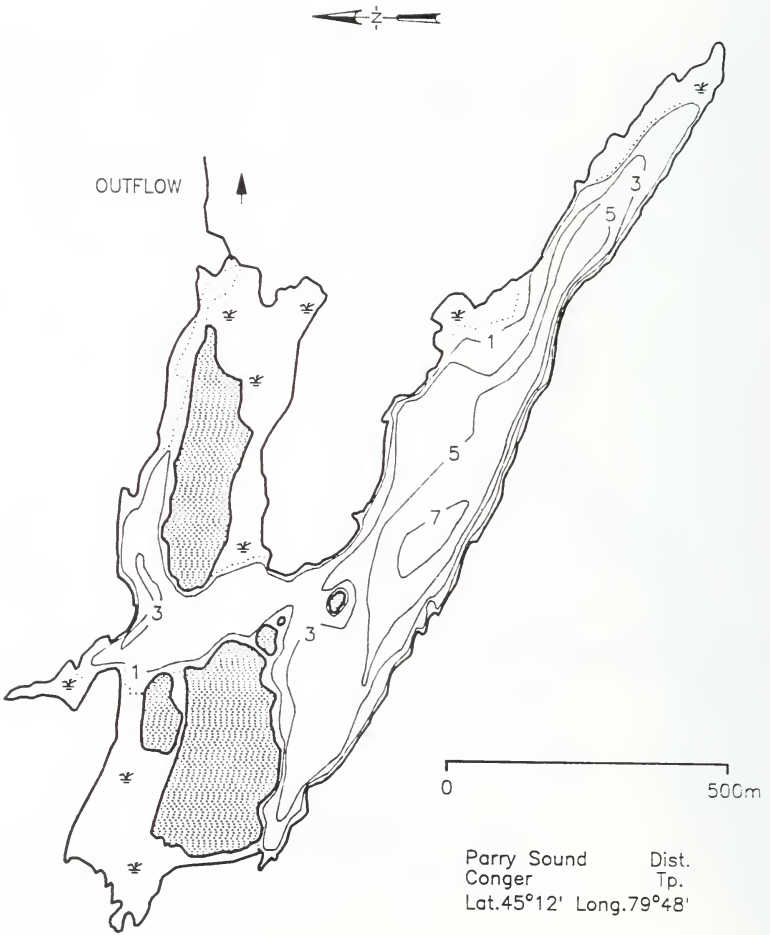


Table 14. Louck's Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
20.84	4.74	2.28	8.2	4.28	2.65	0.83

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	20.84	
		2.68
2	9.33	
		1.40
4	4.69	
		0.57
6	1.29	
		0.09
8.2	0.00	

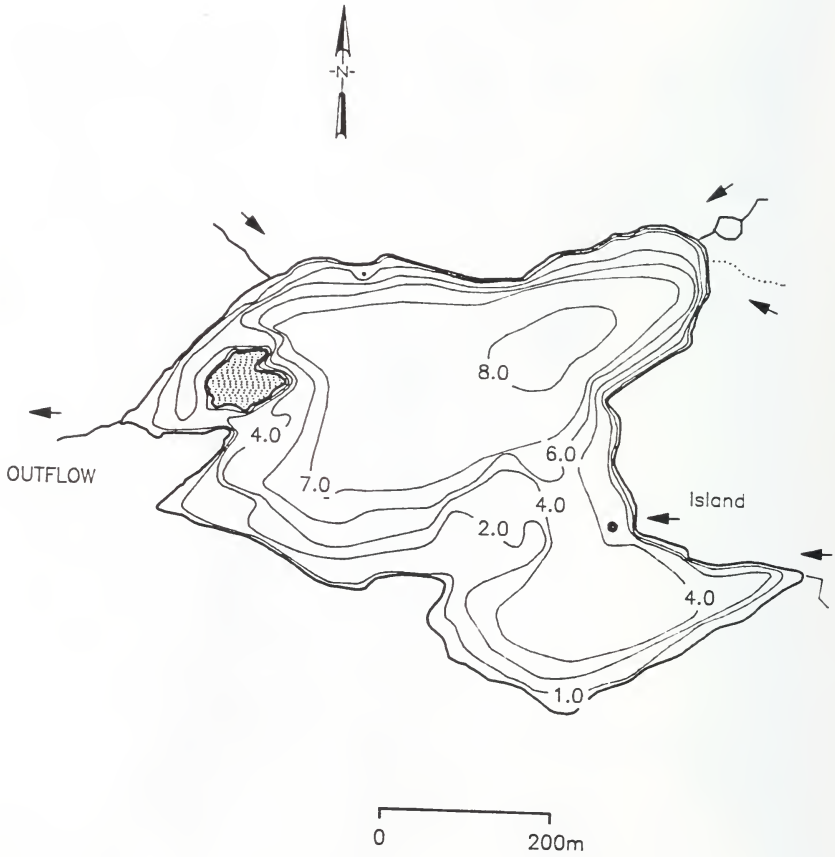
Figure 12: Maggie Lake

Table 15. Maggie Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
138.60	141.00	10.17	31.0	11.55	2.77	0.98

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	138.60	25.58
2	120.20	22.73
4	106.30	19.76
6	91.40	16.79
8	75.94	13.66
10	61.42	11.07
12	49.81	8.91
14	38.99	6.79
16	29.62	5.20
18	22.71	3.96
20	17.00	2.91
22	12.37	2.04
24	7.54	1.05
26	3.36	0.42
28	1.18	0.12
30	0.14	0.01
31	0.00	

Figure 13: Pearceley Lake



Parry Sound Dist.
Chapman Tp.
Lat.45°42' Long.79°30'

Table 16. Pearceley Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_V
44.14	20.82	4.72	8.1	3.1	1.32	1.75

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	44.14	8.03
2	34.68	6.15
4	26.95	4.44
6	17.73	2.21
8.1	0.00	

Figure 14: Pincher Lake

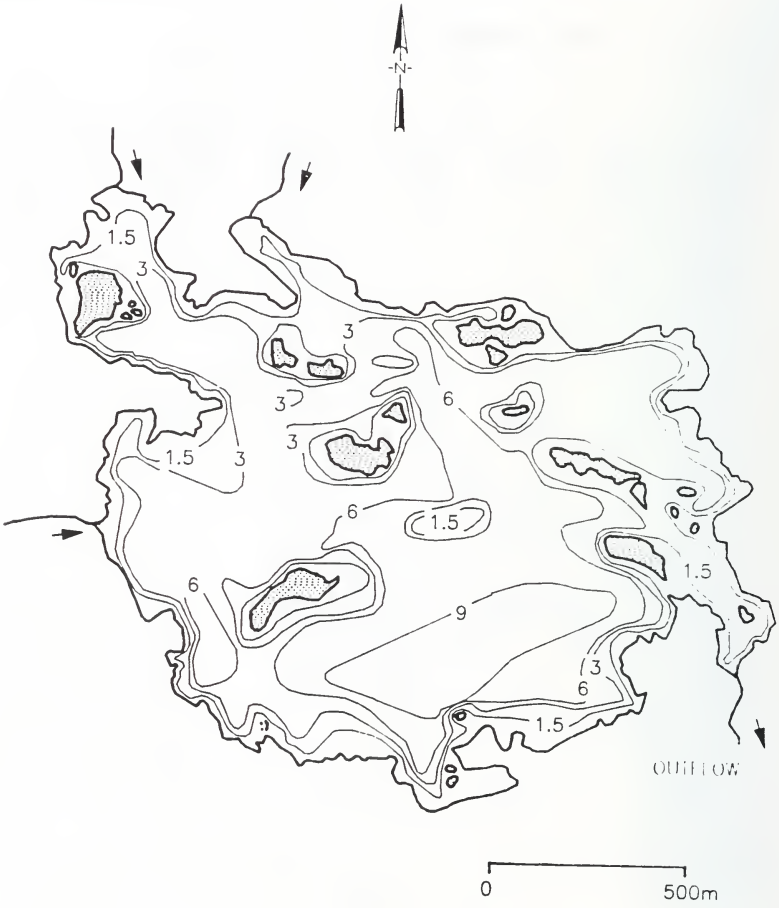
Nipissing Dist.
McCraney Tp.
Lat.45°34' Long.78°51'

Table 17. Pincher Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
42.06	25.48	6.06	15.5	5.52	2.40	1.17

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	42.06	
		7.44
2	33.39	
		6.01
4	26.38	
		4.54
6	19.87	
		3.11
8	12.47	
		2.01
10	8.31	
		1.39
12	5.57	
		0.82
14	2.22	
		0.16
15.5	0.00	

Figure 15: Round Lake



Parry Sound Dist.
Ferguson & Burpee Tp.
Lat.45°31' Long.80°08'

Table 18. Round Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
226.0	99.08	4.38	11.6	11.87	2.23	1.13

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	226.00	39.01
2	166.80	28.31
4	114.60	17.99
6	67.32	9.66
8	31.46	3.73
10	7.15	0.38
11.6	0.00	

Figure 16: Shoelace Lake

Table 19. Shoelace Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
7.23	3.23	4.46	12.0	1.67	1.75	1.12

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	7.23	1.22
2	5.16	0.86
4	3.43	0.54
6	2.10	0.33
8	1.36	0.21
10	0.66	0.59
12	0.00	

Figure 17: Skidway Lake

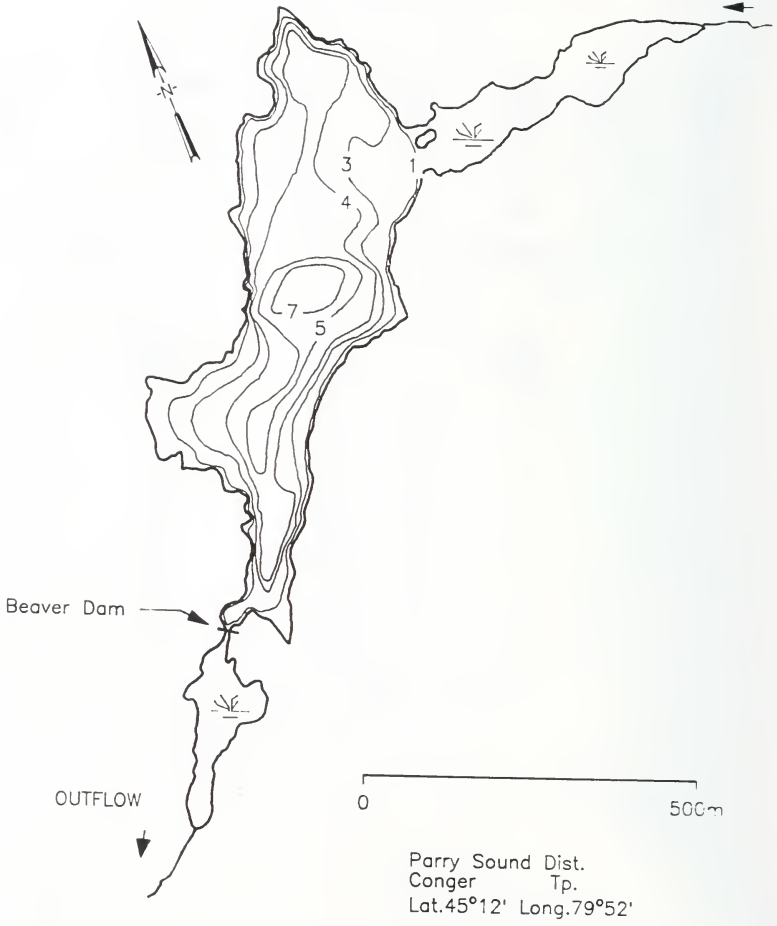
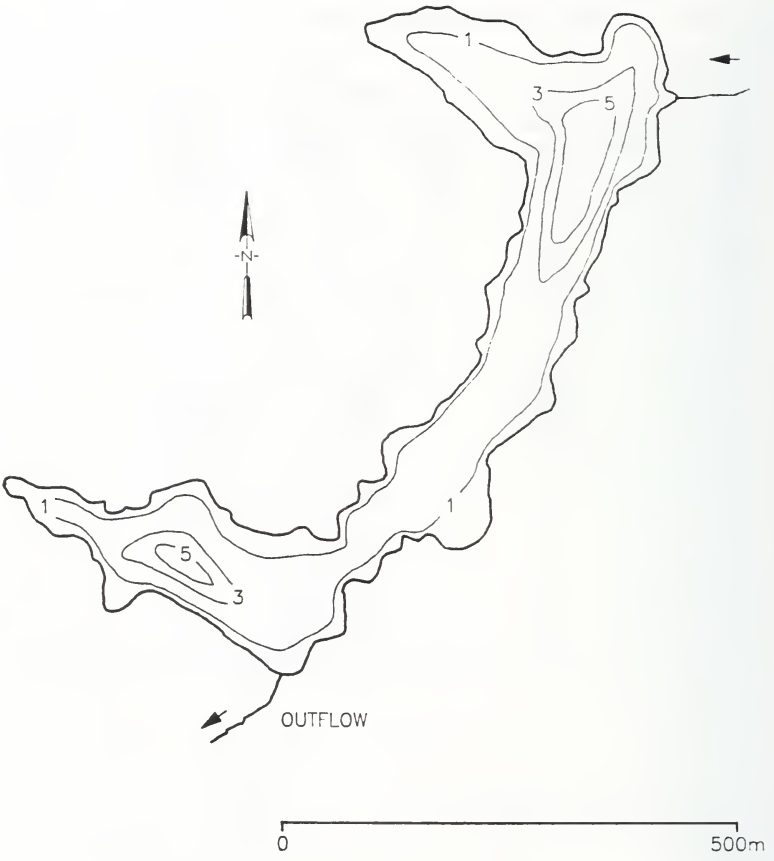


Table 20. Skidway Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
18.48	5.35	2.89	7.8	2.84	1.86	1.11

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	18.48	2.86
2	11.75	1.89
4	6.09	0.50
6	1.06	0.10
7.8	0.00	

Figure 18: Sunset Lake



Nipissing Dist.
McCraney Tp.
Lat.45°34' Long.78°56'

Table 21. Sunset Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_V
12.94	2.36	1.82	6.5	3.11	2.44	0.84

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0.	12.94	1.73
2	4.72	0.49
4	1.31	0.14
6.5	0.00	

Figure 19: Westward Lake

Table 22. Westward Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_V
63.0	129.5	20.54	44.0	3.52	1.25	1.40

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	63.3	
		12.1
2	58.4	
		11.3
4	55.0	
		10.8
6	53.1	
		10.3
8	49.7	
		9.57
10	46.1	
		8.65
12	40.5	
		14.9
16	34.0	
		12.9
20	30.6	
		13.8
25	24.8	
		10.9
30	18.8	
		7.97
35	13.2	
		5.04
40	7.22	
		1.24
44	0.383	

Figure 20: Windfall Lake

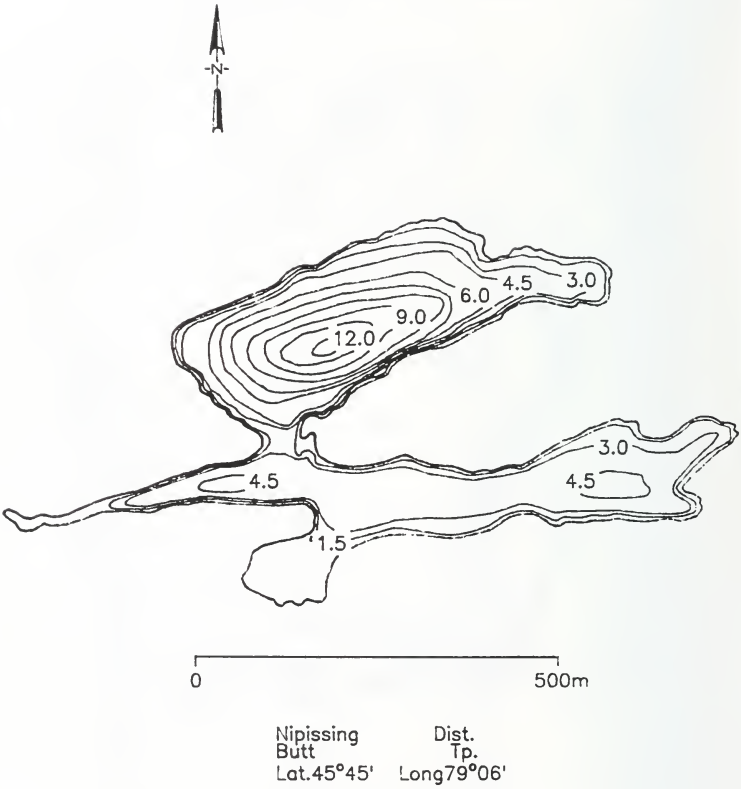


Table 23. Windfall Lake Morphometry Summary.

Lake Area A (ha)	Lake Volume V (m^3x10^5)	Mean Depth $\bar{z}$ (m)	Maximum Depth Zm (m)	Shoreline Length L (km)	Development of Shoreline D_L	Development of Volume D_v
25.7	11.16	4.35	13.8	4.62	2.57	0.95

Contour Depth (m)	Contour Area (ha)	Stratum Volume (m^3x10^5)
0	25.66	
		4.53
2	19.78	
		3.24
4	11.11	
		1.55
6	5.61	
		0.929
8	3.73	
		0.579
10	2.05	
		0.269
12	0.74	
		0.062
13.8	0.00	

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